

Annals of Biomedical Engineering

The Journal of the Biomedical Engineering Society

Volume 35, Number 1, 2007

Coupling of a 3D Finite Element Model of Cardiac Ventricular Mechanics to Lumped Systems Models of the Systemic and Pulmonic Circulation	1
<i>Roy C. P. Kerckhoffs, Maxwell L. Neal, Quan Gu, James B. Bassingthwaite, Jeff H. Omens, and Andrew D. McCulloch</i>	
Biomechanics of the Porcine Basilar Artery in Hypertension	19
<i>J.-J. Hu, T. W. Fossum, M. W. Miller, H. Xu, J.-C. Liu, and J. D. Humphrey</i>	
An Experimentally Derived Stress Resultant Shell Model for Heart Valve Dynamic Simulations	30
<i>Hyunggun Kim, Krishnan B. Chandran, Michael S. Sacks, and Jia Lu</i>	
Optical Vibrocardiography: A Novel Tool for the Optical Monitoring of Cardiac Activity	45
<i>Umberto Morbiducci, Lorenzo Scalise, Mirko De Melis, and Mauro Grigioni</i>	
Reproducibility of Quantitative Estimate of Magnetocardiographic Ventricular Depolarization and Repolarization Parameters in Healthy Subjects and Patients with Coronary Artery Disease	59
<i>Hyun Kyoon Lim, Namsik Chung, Kiwoong Kim, Young-Guk Ko, Hyukchan Kwon, Yong-Ho Lee, Jin-Bae Kim, Jung Rae Cho, Jin-Mok Kim, In-Seon Kim, and Yong Ki Park</i>	
Multi-Scale Computational Model of Fuel Homeostasis During Exercise: Effect of Hormonal Control	69
<i>Jaeyeon Kim, Gerald M. Saidel, and Marco E. Cabrera</i>	
Understanding Effects of Matrix Protease and Matrix Organization on Directional Persistence and Translational Speed in Three-Dimensional Cell Migration	91
<i>Muhammad H. Zaman, Paul Matsudaira, and Douglas A. Lauffenburger</i>	
<i>In vivo</i> MR Imaging of Tissue-engineered Human Mesenchymal Stem Cells Transplanted to Mouse: a Preliminary Study	101
<i>In Kap Ko, Ho-Taek Song, Eun-Jin Cho, Eun Sook Lee, Yong-Min Huh, and Jin-Suck Suh</i>	
Image-Guided High-Intensity Focused Ultrasound for Conduction Block of Peripheral Nerves	109
<i>Jessica L. Foley, James W. Little, and Shahram Vaezy</i>	
Real-Time Patient-Specific Finite Element Analysis of Internal Stresses in the Soft Tissues of a Residual Limb: A New Tool for Prosthetic Fitting	120
<i>S. Portnoy, G. Yarnitzky, Z. Yizhar, A. Kristal, U. Oppenheim, I. Siev-Ner, and A. Gefen</i>	

Annals of Biomedical Engineering

The Journal of the Biomedical Engineering Society

Volume 35, Number 2, 2007

Review Articles

A Comprehensive Survey of Brain Interface Technology Designs 137
S. G. Mason, A. Bashashati, M. Fatourechi, K. F. Navarro, and G. E. Birch

Vertebral Osteoporosis and Trabecular Bone Quality 170
P. Mc Donnell, P. E. Mc Hugh, and D. O' Mahoney

Research Articles

Physiologic Pulsatile Flow Bioreactor Conditioning of Poly(ethylene glycol)-based Tissue Engineered Vascular Grafts 190
Mariah S. Hahn, Melissa K. McHale, Eva Wang, Rachael H. Schmedlen, and Jennifer L. West

Scaling Characteristics of Heart Rate Time Series Before the Onset of Ventricular Tachycardia 201
Mathias Baumert, Niels Wessel, Alexander Schirdewan, Andreas Voss, and Derek Abbott

Finite-Element Stress Analysis of a Multicomponent Model of Sheared and Focally-Adhered Endothelial Cells 208
Michael C. Ferko, Amit Bhatnagar, Mariana B. Garcia, and Peter J. Butler

Contributions of the Active and Passive Components of the Cytoskeletal Prestress to Stiffening of Airway Smooth Muscle Cells 224
Noah Rosenblatt, Shaohua Hu, Béla Suki, Ning Wang, and Dimitrije Stamenović

Three-Dimensional Simulations of Reactive Gas Uptake in Single Airway Bifurcations 235
Adekemi B. Taylor, Ali Borhan, and James S. Ultman

Effects of Exercise and Respiration on Hemodynamic Efficiency in CFD Simulations of the Total Cavopulmonary Connection 250
Alison L. Marsden, Irene E. Vignon-Clementel, Frandics P. Chan, Jeffrey A. Feinstein, and Charles A. Taylor

The Impact of Breathing Pattern and Lung Size on the Alcohol Breath Test 264
Michael P. Hlastala and Joseph C. Anderson

The Relative Contributions of Compression and Hypoxia to Development of Muscle Tissue Damage: An *In Vitro* Study 273
Debby Gawlitza, Wei Li, Cees W. J. Oomens, Frank P. T. Baaijens, Dan L. Bader, and Carlijn V. C. Bouting

Biomechanical Characterization of Internal Layer Subfailure in Blunt Arterial Injury 285
Brian D. Stemper, Narayan Yoganandan, Grant P. Sinson, Thomas A. Gennarelli, Michael R. Stineman, and Frank A. Pintar

Use of X-ray Tomography to Map Crystalline and Amorphous Phases in Frozen Biomaterials 292
J.C. Bischof, B. Mahr, J.H. Choi, M. Behling, and D. Mewes

Viscoelastic Properties of Human Tympanic Membrane <i>Tao Cheng, Chenkai Dai, and Rong Z. Gan</i>	305
Implementation Issues in Approximate Methods for Stochastic Hodgkin-Huxley Models <i>Ian C. Bruce</i>	315
Response: Implementation Issues in Approximate Methods for Stochastic Hodgkin-Huxley models <i>John A. White, Jay T. Rubinstein, and Hiroyuki Mino</i>	319
Erratum	
Cellular and Matrix Contributions to Tissue Construct Stiffness Increase with Cellular Concentration <i>J. Pablo Marquez, Guy M. Genin, Kenneth M. Pryse, and Elliot L. Elson</i>	320

Annals of Biomedical Engineering

The Journal of the Biomedical Engineering Society

Volume 35, Number 3, 2007

Incorporation of Myofilament Activation Mechanics into a Lumped Model of the Human Heart <i>Dimitri Deserranno, Mohammad Kassemi, and James D. Thomas</i>	321
Optimal Planar Flow Network Designs for Tissue Engineered Constructs with Built-in Vasculature <i>Vijayakumar Janakiraman, Kamlesh Mathur, and Harihara Baskaran</i>	337
Mechanical Properties and Compositions of Tissue Engineered and Native Arteries <i>Shannon L. M. Dahl, Caroline Rhim, Ying C. Song, and Laura E. Niklason</i>	348
Vasoactivity of Blood Vessels Using a Novel Isovolumic Myograph <i>Xiao Lu and Ghassan S. Kassab</i>	356
Phonocardiographic Signal Analysis Method Using a Modified Hidden Markov Model <i>Ping Wang, Chu Sing Lim, Sunita Chauhan, Jong Yong A. Foo, and Venkataraman Anantharaman</i>	367
Adhesion and Function of Human Endothelial Cells Co-cultured on Smooth Muscle Cells <i>Charles Stevenson Wallace, John C. Champion, and George A. Truskey</i>	375
Image Correlation Algorithm for Measuring Lymphocyte Velocity and Diameter Changes in Contracting Microlymphatics <i>J. Brandon Dixon, Anatoliy A. Gashev, David C. Zawieja, James E. Moore Jr., and Gerard L. Coté</i>	387
The Adhesion Between a Microvillus-Bearing Cell and a Ligand-Coated Substrate: A Monte Carlo Study <i>Jin-Yu Shao and Gang Xu</i>	397
Computational Modeling of Factor Xa Inhibition by Immobilized Tissue Factor Pathway Inhibitor <i>Shanti R. Tummala and Connie L. Hall</i>	408
Quantitative Analysis of Temporal and Spatial Variations of Chondrocyte Behavior in Engineered Cartilage during Long-Term Culture <i>Kwideok Park, Byoung-Hyun Min, Dong Keun Han, and Karen Hasty</i>	419
Flow Perfusion Improves Seeding of Tissue Engineering Scaffolds with Different Architectures <i>Jose F. Alvarez-Barreto, Shawna M. Linehan, Robert L. Shambaugh, and Vassilios I. Sikavitsas</i>	429
Multivariate Objective Response Detectors (MORD): Statistical Tools for Multichannel EEG Analysis During Rhythmic Stimulation <i>Leonardo Bonato Felix, Antonio Mauricio Ferreira Leite Miranda De Sá, Antonio Fernando Catelli Infantosi, and Hani Camille Yehia</i>	443

Parametric Modeling of DSC-MRI Data with Stochastic Filtration and Optimal Input Design Versus Non-Parametric Modeling <i>Renata Kalicka and Anna Pietrenko-Dąbrowska</i>	453
Identification of Human Term and Preterm Labor using Artificial Neural Networks on Uterine Electromyography Data <i>William L. Maner and Robert E. Garfield</i>	465
A Distributed Model of Carbohydrate Transport and Metabolism in the Liver during Rest and High-Intensity Exercise <i>E. Chalhoub, L. Xie, V. Balasubramanian, J. Kim, and J. Belovich</i>	474

Annals of Biomedical Engineering

The Journal of the Biomedical Engineering Society

Volume 35, Number 4, 2007

Research Articles

DPIV Prediction of Flow Induced Platelet Activation—Comparison to Numerical Predictions <i>Sagi Raz, Shmuel Einav, Yared Alemu, and Danny Bluestein</i>	493
Modulation of ATP/ADP Concentration at the Endothelial Surface by Shear Stress: Effect of Flow Recirculation <i>Hyo Won Choi, Katherine W. Ferrara, and Abdul I. Barakat</i>	505
A Model of NO/O ₂ Transport in Capillary-perfused Tissue Containing an Arteriole and Venule Pair <i>Xuewen Chen, Donald G. Buerk, Kenneth A. Barbee, and Dov Jaron</i>	517
Layer-Specific 3D Residual Deformations of Human Aortas with Non-Atherosclerotic Intimal Thickening <i>Gerhard A. Holzapfel, Gerhard Sommer, Martin Auer, Peter Reginig, and Ray W. Ogden</i>	530
Morphometry-Based Impedance Boundary Conditions for Patient-Specific Modeling of Blood Flow in Pulmonary Arteries <i>Ryan L. Spilker, Jeffrey A. Feinstein, David W. Parker, V. Mohan Reddy, and Charles A. Taylor</i>	546
Transport and Deposition of Micro-Aerosols in Realistic and Simplified Models of the Oral Airway <i>Jinxiang Xi and P. Worth Longest</i>	560
IL-8 Response of Cyclically Stretching Alveolar Epithelial Cells Exposed to Non-fibrous Particles <i>S. M. Mijailovich, K. Hamada, and A. Tsuda</i>	582
Dynamics of Neutrophil Membrane Compliance and Microstructure probed with a Micropipet-based Piconewton Force Transducer <i>Scott I. Simon, Tun Nyunt, Kathryn Florine-Casteel, Ken Ritchie, H. P. Ting-Beall, Evan Evans, and David Needham</i>	595
Tumor Anti-angiogenic Gene Therapy with Microencapsulated Recombinant CHO Cells <i>Ying Zhang, Wei Wang, Jing Zhou, Weiting Yu, Xulang Zhang, Xin Guo, and Xiaojun Ma</i>	605
Protein Transport to Choroid and Retina following Periocular Injection: Theoretical and Experimental Study <i>Feilim Mac Gabhann, Anna Maria Demetriadis, Tye Deering, Jonathan D. Packer, Syed Mahmood Shah, Elia Duh, Peter A. Campochiaro, and Aleksander S. Popel</i>	615
Design Considerations for an Implantable, Muscle Powered Piezoelectric System for Generating Electrical Power <i>B. E. Lewandowski, K. L. Kilgore, and K. J. Gustafson</i>	631

Predicting Failure Load of the Femur with Simulated Osteolytic Defects using Noninvasive Imaging Technique in a Simplified Load Case <i>Taeyong Lee</i>	642
A New Approach to the Non-unique Probe Selection Problem <i>Cláudio N. Meneses, Panos M. Pardalos, and Michelle A. Ragle</i>	651
A Computational Parameter Study of Embryo Transfer <i>Istvan G. Lauko, Paolo Rinaudo, and Sava Dashev</i>	659
Measurement of <i>in vivo</i> Stress Resultants in Neurulation-stage Amphibian Embryos <i>Richard Benko and G. Wayne Brodland</i>	672

Annals of Biomedical Engineering

The Journal of the Biomedical Engineering Society

Volume 35, Number 5, 2007

Regulation of Antioxidants and Phase 2 Enzymes by Shear-Induced Reactive Oxygen Species in Endothelial Cells <i>Charles I. Jones III, Hong Zhu, Sergio F. Martin, Zhaosheng Han, Yunbo Li, and B. Rita Alevriadou</i>	683
A Novel Method for Visualization of Entire Coronary Arterial Tree <i>Thomas Wischgoll, Joerg Meyer, Benjamin Kaimovitz, Yoram Lanir, and Ghassan S. Kassab</i>	694
Modeling Plaque Fissuring and Dissection during Balloon Angioplasty Intervention <i>T. Christian Gasser and Gerhard A. Holzapfel</i>	711
Pattern Detection of Atherosclerosis from Carotid Artery Doppler Signals using Fuzzy Weighted Pre-Processing and Least Square Support Vector Machine (LSSVM) <i>Kemal Polat, Sadik Kara, Fatma Latifoğlu, and Salih Güneş</i>	724
Cardiac and Respiratory MRI Gating Using Combined Wavelet Sub-Band Decomposition and Adaptive Filtering <i>Dima Abi-Abdallah, Agnès Drochon, Vincent Robin, and Odette Fokapu</i>	733
Detection of Nonlinearity in Cardiovascular Variability Signals using Cyclostationary Analysis <i>Saeid Seydnejad</i>	744
Two-Dimensional Simulation of Red Blood Cell Deformation and Lateral Migration in Microvessels <i>Timothy W. Secomb, Beata Styp-Rekowska, and Axel R. Pries</i>	755
Simulation of Neutrophil Deformation and Transport in Capillaries using Newtonian and Viscoelastic Drop Models <i>Chunfeng Zhou, Pengtao Yue, and James J. Feng</i>	766
Kinetic Modeling of Contrast-Enhanced MRI: An Automated Technique for Assessing Inflammation in the Rheumatoid Arthritis Wrist <i>Matthew L. Zierhut, Jill C. Gardner, Mary E. Spilker, John T. Sharp, and Paolo Vicini</i>	781
Endochondral Bone Formation from Hydrogel Carriers Loaded with BMP2-transduced Cells <i>Malavosklish Bikram, Christine Fouletier-Dilling, John A. Hipp, Francis Gannon, Alan R. Davis, Elizabeth A. Olmsted-Davis, and Jennifer L. West</i>	796
A Mechanical Study of Rigid Plate Configurations for Sternal Fixation <i>Shruti Pai, Najmuddin J. Gunja, Erin L. Dupak, Nicole L. McMahon, James C. Coburn, Janice F. Lalikos, Raymond M. Dunn, Nicola Francalancia, George D. Pins, and Kristen L. Billiar</i>	808
Natural Frequency Analysis of Osseointegration for Trans-femoral Implant <i>F. Shao, W. Xu, A. Crocombe, and D. Ewins</i>	817

Electromagnetic Power Absorption and Temperature Changes due to Brain Machine Interface Operation <i>Tamer S. Ibrahim, Doney Abraham, and Robert L. Rennaker</i>	825
Collagen-Dependent Neurite Outgrowth and Response to Dynamic Deformation in Three-Dimensional Neuronal Cultures <i>D. Kacy Cullen, M. Christian Lessing, and Michelle C. LaPlaca</i>	835
Nonlinear Dynamic Model of CA1 Short-Term Plasticity using Random Impulse Train Stimulation <i>Ghassan Gholmeh, Spiros Courellis, Vasilis Marmarelis, and Theodore Berger</i>	847
Erratum Finite-Element Stress Analysis of a Multicomponent Model of Sheared and Focally-Adhered Endothelial Cells <i>Michael C. Ferko, Amit Bhatnagar, Mariana B. Garcia, and Peter J. Butler</i>	858

Annals of Biomedical Engineering

The Journal of the Biomedical Engineering Society

Volume 35, Number 6, 2007

Special Issue: Systems Biology, Bioinformatics, and Computational Biology

Guest Editors: Gerald M. Saidel and Jie Liang

ABME Special Issue: Systems Biology, Bioinformatics, and Computational Biology <i>Gerald M. Saidel and Jie Liang</i>	861
Integrated Energy and Flux Balance Based Multiobjective Framework for Large-Scale Metabolic Networks <i>Deepak Nagrath, Marco Avila-Elchiver, Francois Berthiaume, Arno W. Tilles, Achille Messac, and Martin L. Yarmush</i>	863
Statistical Analysis of Metabolic Pathways of Brain Metabolism at Steady State <i>R. Occhipinti, M. A. Puchowicz, J. C. LaManna, E. Somersalo, and D. Calvetti</i>	886
Estimation of Likely Cancer Cure Using First- and Second-Order Product Densities of Population Balance Models <i>Eric Sherer, Robert E. Hannemann, Ann Rundell, and Doraiswami Ramkrishna</i>	903
Multi-cell Agent-based Simulation of the Microvasculature to Study the Dynamics of Circulating Inflammatory Cell Trafficking <i>Alexander M. Bailey, Bryan C. Thorne, and Shayn M. Peirce</i>	916
A Multi-Scale Model of Dendritic Cell Education and Trafficking in the Lung: Implications for T Cell Polarization <i>David J. Klinke II</i>	937
Linking Pulmonary Oxygen Uptake, Muscle Oxygen Utilization and Cellular Metabolism during Exercise <i>Nicola Lai, Marco Camesasca, Gerald M. Saidel, Ranjan K. Dash, and Marco E. Cabrera</i>	956
Mechanistic Computational Model of Ovarian Steroidogenesis to Predict Biochemical Responses to Endocrine Active Compounds <i>Michael S. Breen, Daniel L. Villeneuve, Miyuki Breen, Gerald T. Ankley, and Rory B. Conolly</i>	970
Multi-scale Computational Models of Pro-angiogenic Treatments in Peripheral Arterial Disease <i>Feilim Mac Gabhann, James W. Ji, and Aleksander S. Popel</i>	982
Relationships between Actin Regulatory Mechanisms and Measurable State Variables <i>Michael Bindschadler and James L. McGrath</i>	995
A Multiscale Computational Approach to Dissect Early Events in the Erb Family Receptor Mediated Activation, Differential Signaling, and Relevance to Oncogenic Transformations <i>Yingting Liu, Jeremy Purvis, Andrew Shih, Joshua Weinstein, Neeraj Agrawal, and Ravi Radhakrishnan</i>	1012

Protein Interfacial Pocket Engineering via Coupled Computational Filtering and Biological Focusing Criterion <i>Faisal Reza, Peijun Zuo, and Jingdong Tian</i>	1026
Predicting Enzyme Functional Surfaces and Locating Key Residues Automatically from Structures <i>Yan Yuan Tseng and Jie Liang</i>	1037
Learning to Translate Sequence and Structure to Function: Identifying DNA Binding and Membrane Binding Proteins <i>Robert E. Langlois, Matthew B. Carson, Nitin Bhardwaj, and Hui Lu</i>	1043
Context Specific Transcription Factor Prediction <i>Eric Yang, David Simcha, Richard R. Almon, Debra C. Dubois, William J. Jusko, and Ioannis P. Androulakis</i>	1053
chip artifact CORRECTION (caCORRECT): A Bioinformatics System for Quality Assurance of Genomics and Proteomics Array Data <i>Todd H. Stokes, Richard A. Moffitt, John H. Phan, and May D. Wang</i>	1068
Large-Scale Automated Analysis of Location Patterns in Randomly Tagged 3T3 Cells <i>Elvira García Osuna, Juchang Hua, Nicholas W. Bateman, Ting Zhao, Peter B. Berget, and Robert F. Murphy</i>	1081
Tissue-driven Hypothesis with Gene Ontology (GO) Analysis <i>Zhixi Su, Yong Huang, and Xun Gu</i>	1088
Large-Scale Optimization-Based Classification Models in Medicine and Biology <i>Eva K. Lee</i>	1095

Annals of Biomedical Engineering

The Journal of the Biomedical Engineering Society

Volume 35, Number 7, 2007

Atherogenic Endothelial Cell eNOS and ET-1 Responses to Asynchronous Hemodynamics are Mitigated by Conjugated Linoleic Acid	1111
<i>Michael B. Dancu, Danielle E. Berardi, John P. Vanden Heuvel, and John M. Tarbell</i>	
Flow and High Affinity Binding Affect the Elastic Modulus of the Nucleus, Cell Body and the Stress Fibers of Endothelial Cells	1120
<i>Anshu B. Mathur, William M. Reichert, and George A. Truskey</i>	
Role of Vortices in Growth of Microbubbles at Mitral Mechanical Heart Valve Closure	1131
<i>Edmond Rambod, Masoud Beizai, David J. Sahn, and Morteza Gharib</i>	
Development of Gradient Descent Adaptive Algorithms to Remove Common Mode Artifact for Improvement of Cardiovascular Signal Quality	1146
<i>Edward J. Caccio and Evangelia Micheli-Tzanakou</i>	
Design of a New Stretching Apparatus and the Effects of Cyclic Strain and Substratum on Mouse Lung Epithelial-12 Cells	1156
<i>Stephen P. Arold, Joyce Y. Wong, and Bela Suki</i>	
A Recruitment Model of Quasi-Linear Power-Law Stress Adaptation in Lung Tissue	1165
<i>Jason H. T. Bates</i>	
Noninvasive Determination of Ligament Strain with Deformable Image Registration	1175
<i>Nikhil S. Phatak, Qunli Sun, Seong-Eun Kim, Dennis L. Parker, R. Kent Sanders, Alexander I. Veress, Benjamin J. Ellis, and Jeffrey A. Weiss</i>	
In Vitro System for Applying Cyclic Loads to Connective Tissues Under Displacement or Force Control	1188
<i>Krishna R. Asundi, Kathy Kursa, Jeff Lotz, and David M. Rempel</i>	
Fatigue Performance of Composite Analogue Femur Constructs under High Activity Loading	1196
<i>Alexander C. M. Chong, Elizabeth A. Friis, Gregory P. Ballard, Peter J. Czuwala, and Francis W. Cooke</i>	
Numerical Simulation of Asymmetrically Altered Growth as Initiation Mechanism of Scoliosis	1206
<i>A. van der Plaats, A. G. Veldhuizen, and G. J. Verkerke</i>	
Effect of the Structural Water on the Mechanical Properties of Collagen-like Microfibrils: A Molecular Dynamics Study	1216
<i>Dajun Zhang, Uday Chippada, and Kenneth Jordan</i>	
Collagen Gel Anisotropy Measured by 2-D Laser Trap Microrheometry	1231
<i>Aron Parekh and Darrell Velegol</i>	

The Role of 3-Canal Biomechanics in Angular Motion Transduction by the Human Vestibular Labyrinth	1247
<i>Marytheresa A. Ifediba, Suhrud M. Rajguru, Timothy E. Hullar, and Richard D. Rabbitt</i>	
Electric Fields around and within Single Cells during Electroporation—A Model Study	1264
<i>Brian J. Mossop, Roger C. Barr, Joshua W. Henshaw, and Fan Yuan</i>	
Mitochondrial Inner Membrane Electrophysiology Assessed by Rhodamine-123 Transport and Fluorescence	1276
<i>M. Huang, A. K. S. Camara, D. F. Stowe, F. Qi, and D. A. Beard</i>	
A Mathematical Model of the Oral Glucose Tolerance Test Illustrating the Effects of the Incretins	1286
<i>Patricia L. Brubaker, Elan L. Ohayon, Lisa M. D'Alessandro, and Kenneth H. Norwich</i>	

Annals of Biomedical Engineering

The Journal of the Biomedical Engineering Society

Volume 35, Number 8, 2007

Review/Teaching Articles

A Call to Action for Bioengineers and Dental Professionals: Directives for the Future of TMJ Bioengineering 1301
Michael S. Detamore, Kyriacos A. Athanasiou, and Jeremy Mao

Comparison of Student Learning in Challenge-based and Traditional Instruction in Biomedical Engineering 1312
Taylor Martin, Stephanie D. Rivale, and Kenneth R. Diller

A Translational Bioengineering Course Provides Substantial Gains in Civic Scientific Literacy 1324
Rebecca Richards-Kortum, Deanna Buckley, Richard A. Schwarz, E. Neely Atkinson, and Michele Follen

Research Articles

Spatio-temporal Flow Analysis in Bileaflet Heart Valve Hinge Regions: Potential Analysis for Blood Element Damage 1333
Hélène A. Simon, Lakshmi P. Dasi, Hwa-Liang Leo, and Ajit P. Yoganathan

Models of Flow-Induced Loading on Blood Cells in Laminar and Turbulent Flow, with Application to Cardiovascular Device Flow 1347
Nathan J. Quinlan and Patrick N. Dooley

In Vitro Characterization of a Compliant Biodegradable Scaffold with a Novel Bioreactor System 1357
Antonio R. Webb, Bryan D. Macrie, Ananda S. Ray, Jack E. Russo, Andrew M. Siegel, Matthew R. Glucksberg, and Guillermo A. Ameer

Methods for Three-Dimensional Geometric Characterization of the Arterial Vasculature 1368
Padraig M. O'Flynn, Gerard O'Sullivan, and Abhay S. Pandit

Complimentary Endothelial Cell/Smooth Muscle Cell Co-Culture Systems with Alternate Smooth Muscle Cell Phenotypes 1382
Stacey L. Rose and Julia E. Babensee

MRI-guided Thermal Ablation Therapy: Model and Parameter Estimates to Predict Cell Death from MR Thermometry Images 1391
Michael S. Breen, Miyuki Breen, Kim Butts, Lili Chen, Gerald M. Saidel, and David L. Wilson

Neural Network Analysis of *Ex-vivo* Expansion of Hematopoietic Stem Cells 1404
Xiubo Fan, Tianqing Liu, Xiangqin Li, Yang Liu, Xuehu Ma, and Zhanfeng Cui

An *In Vitro* System to Evaluate the Effects of Ischemia on Survival of Cells Used for Cell Therapy 1414
Bryce H. Davis, Thies Schroeder, Pavel S. Yarmolenko, Farshid Guilak, Mark W. Dewhirst, and Doris A. Taylor

A Nonlinear Model of Cardiac Autonomic Control in Obstructive Sleep Apnea Syndrome	1425
<i>Javier A. Jo, Anna Blasi, Edwin M. Valladares, Ricardo Juarez, Ahmet Baydur, and Michael C. K. Khoo</i>	
Mapping Melanoma Lymphoscintigraphy Data onto a 3D Anatomically Based Model	1444
<i>Hayley M. Reynolds, P. Rod Dunbar, Roger F. Uren, John F. Thompson, and Nicolas P. Smith</i>	
Modeling of Microbial Population Responses to Time-Periodic Concentrations of Antimicrobial Agents	1458
<i>Michael Nikolaou, Amy N. Schilling, Giao Vo, Kai-tai Chang, and Vincent H. Tam</i>	
Relative Contributions of Collagen and Elastin to Elasticity of the Vocal Fold Under Tension	1471
<i>Roger W. Chan, Min Fu, Lindsay Young, and Neeraj Tirunagari</i>	

Annals of Biomedical Engineering

The Journal of the Biomedical Engineering Society

Volume 35, Number 9, 2007

Research Articles

Biochemomechanics of Cerebral Vasospasm and its Resolution: I. A New Hypothesis and Theoretical Framework <i>J.D. Humphrey, S. Baek, and L. E. Niklason</i>	1485
Biochemomechanics of Cerebral Vasospasm and its Resolution: II. Constitutive Relations and Model Simulations <i>S. Baek, A. Valentín, and J.D. Humphrey</i>	1498
Physiology Driven Adaptivity for the Numerical Solution of the Bidomain Equations <i>Jonathan P. Whiteley</i>	1510
Model Based Sensitivity Analysis of EMG-Force Relation with Respect to Motor Unit Properties: Applications to Muscle Paresis in Stroke <i>Ping Zhou, Nina L. Suresh, and William Z. Rymer</i>	1521
Teager-Kaiser Energy Operation of Surface EMG Improves Muscle Activity Onset Detection <i>Xiaoyan Li, Ping Zhou, and Alexander S. Aruin</i>	1532
Modeling of Size Dependent Failure in Cardiovascular Stent Struts under Tension and Bending <i>F. J. Harewood and P. E. McHugh</i>	1539
Effect of pH and Metal Ions on the Decomposition Rate of S-nitrosocysteine <i>Jun Gu and Randy S. Lewis</i>	1554
Mathematical Modeling of Guided Neurite Extension in an Engineered Conduit with Multiple Concentration Gradients of Nerve Growth Factor (NGF) <i>T.H.Z. Tse, B.P. Chan, C.M. Chan, and J. Lam</i>	1561
High-Frequency Oscillations Detected in Epileptic Networks Using Swarmed Neural-Network Features <i>Hiram Firpi, Otis Smart, Greg Worrell, Eric Marsh, Dennis Dlugos, and Brian Litt</i>	1573
Cyclic Pressure Stimulates DNA Synthesis through the PI3K/Akt Signaling Pathway in Rat Bladder Smooth Muscle Cells <i>Joshua Stover and Jiro Nagatomi</i>	1585
A Quantitative Model of Gastric Smooth Muscle Cellular Activation <i>Alberto Corrias and Martin L. Buist</i>	1595
An Indentation Technique to Characterize the Mechanical and Viscoelastic Properties of Human and Porcine Corneas <i>Mark Ahearne, Ying Yang, Kong Y. Then, and Kuo-Kang Liu</i>	1608
Effect of Food Consistency on the Degree of Mineralization in the Rat Mandible <i>Eiji Tanaka, Ryota Sano, Nobuhiko Kawai, Geerling E.J. Langenbach, Peter Brugman, Kazuo Tanne, and Theo M.G.J. van Eijden</i>	1617

Regional Variations in the Apparent and Tissue-Level Mechanical Parameters of Vertebral Trabecular Bone with Aging Using Micro-Finite Element Analysis <i>He Gong, Ming Zhang, Ling Qin, and Yajun Hou</i>	1622
Probabilistic Modeling of Knee Muscle Moment Arms: Effects of Methods, Origin-Insertion, and Kinematic Variability <i>Saikat Pal, Joseph E. Langenderfer, Joshua Q. Stowe, Peter J. Laz, Anthony J. Petrella, and Paul J. Rullkoetter</i>	1632
Book Reviews	
An Introduction to Biomechanics: Solids and Fluids, Analysis and Design. By Jay D. Humphrey and Sherry L. Delange <i>Reviewed by Benjamin S. Kelly</i>	1643
Science and Technology in Medicine. By Andras Gedeon <i>Reviewed by Muhammed Hassanali</i>	1645

Annals of Biomedical Engineering

The Journal of the Biomedical Engineering Society

Volume 35, Number 10, 2007

Review Article

The Use of Stem Cells' Hematopoietic Stimulating Factors Therapy Following Spinal Cord Injury 1647
Afshin A. Divani, Muhammad S. Hussain, Ella Magal, Robert F. Heary, and Adnan I. Qureshi

Research Articles

Non-Invasive Time-Lapsed Monitoring and Quantification of Engineered Bone-Like Tissue 1657
Henri Hagenmüller, Sandra Hofmann, Thomas Kohler, Hans P. Merkle, David L. Kaplan, Gordana Vunjak-Novakovic, Ralph Müller, and Lorenz Meinel

The Influence of Mineralization on Intratrabecular Stress and Strain Distribution in Developing Trabecular Bone 1668
Lars Mulder, Leo J. van Ruijven, Jan Harm Koolstra, and Theo M.G.J. van Eijden

A Local Adaptive Threshold Strategy for High Resolution Peripheral Quantitative Computed Tomography of Trabecular Bone 1678
Andrew J. Burghardt, Galateia J. Kazakia, and Sharmila Majumdar

A Finite Element Dual Porosity Approach to Model Deformation-Induced Fluid Flow in Cortical Bone 1687
Pere Fornells, José Manuel García-Aznar, and Manuel Doblaré

Modeling Skull Electrical Properties 1699
R.J. Sadleir and A. Argibay

Fatigue is More Damaging than Creep in Ligament Revealed by Modulus Reduction and Residual Strength 1713
Gail M. Thornton, Timothy D. Schwab, and Thomas R. Oxland

Reliability of Estimating Stochastic Lung Tissue Heterogeneity from Pulmonary Impedance Spectra: A Forward-Inverse Modeling Study 1722
David W. Kaczka, Christopher B. Massa, and Brett A. Simon

Anisotropic Diffusive Transport in Annulus Fibrosus: Experimental Determination of the Diffusion Tensor by FRAP Technique 1739
Francesco Travascio and Wei Yong Gu

An Ultrastructural Analysis of Collagen in Tissue Engineered Arteries 1749
Shannon L.M. Dahl, Megann E. Vaughn, and Laura E. Niklason

Vulnerability to Reentry in a Regionally Ischemic Tissue: A Simulation Study 1756
Beatriz Trénor, Lucía Romero, José María Ferrero Jr., Javier Sáiz, Germán Moltó, and José Miguel Alonso

Geodesic Based Registration of Sensor Data and Anatomical Surface Image Data <i>Bruce Hopenfeld, Hiroshi Ashikaga, and Elliot R. McVeigh</i>	1771
Influence of Pulsatile Flow on LDL Transport in the Arterial Wall <i>Nanfeng Sun, Nigel B. Wood, Alun D. Hughes, Simon A.M. Thom, and X.Yun Xu</i>	1782
The Application of Ink-Jet Technology for the Coating and Loading of Drug-Eluting Stents <i>Peter J. Tarcha, Donald Verlee, Ho Wah Hui, Jeff Setesak, Bogdan Antohe, Delia Radulescu, and David Wallace</i>	1791
Evaluation of Mechanisms of Postflight Orthostatic Intolerance with a Simple Cardiovascular System Model <i>Justin Broskey and M. Keith Sharp</i>	1800
Optimal Micropattern Dimensions Enhance Neurite Outgrowth Rates, Lengths, and Orientations <i>MinJung Song and Kathryn E. Uhrich</i>	1812
Assessing the Use of the "Opening Angle Method" to Enforce Residual Stresses in Patient-Specific Arteries <i>Victor Alastrué, Estefanía Peña, Miguel Ángel Martínez, and Manuel Doblaré</i>	1821
Erratum	
Reliability of Estimating Stochastic Lung Tissue Heterogeneity from Pulmonary Impedance Spectra: A Forward-Inverse Modeling Study <i>David W. Kaczka, Christopher B. Massa, and Brett A. Simon</i>	1838

Annals of Biomedical Engineering

The Journal of the Biomedical Engineering Society

Volume 35, Number 11, 2007

Editorial <i>Larry V. McIntire</i>	1839
Research Articles	
Progress in the CFD Modeling of Flow Instabilities in Anatomical Total Cavopulmonary Connections <i>Chang Wang, Kerem Pekkan, Diane De Zélicourt, Marc Horner, Ajay Parihar, Ashish Kulkarni, and Ajit P. Yoganathan</i>	1840
A Numerical Model to Study the Interaction of Vascular Stents with Human Atherosclerotic Lesions <i>Dimitrios E. Kiousis, T. Christian Gasser, and Gerhard A. Holzapfel</i>	1857
Vascular Dynamics of a Shape Memory Polymer Foam Aneurysm Treatment Technique <i>Jason Ortega, Duncan Maitland, Tom Wilson, William Tsai, Ömer Savaş, and David Saloner</i>	1870
Analysis of pH Gradients Resulting from Mass Transport Limitations in Engineered Heart Tissue <i>David A. Brown, William R. MacLellan, Benjamin M. Wu, and Ramin E. Beygui</i>	1885
Oxygen Uptake Estimation in Humans During Exercise Using a Hammerstein Model <i>Steven W. Su, Lu Wang, Branko G. Celler, and Andrey V. Savkin</i>	1898
The Effect of Regional Variations of the Trabecular Bone Properties on the Compressive Strength of Human Vertebral Bodies <i>Do-Gyo Kim, Christine A. Hunt, Roger Zuel, David P. Fyhrie, and Yener N. Yeni</i>	1907
Culture Duration Modulates Collagen Hydrolysate-Induced Tissue Remodeling in Chondrocyte-Seeded Agarose Hydrogels <i>Kenneth W. Ng, Justin D. Saliman, Evan Y. Lin, Lauren Y. Statman, Lindsay E. Kugler, Sean B. Lo, Gerard A. Ateshian, and Clark T. Hung</i>	1914
Automatic Prospective Registration of High-Resolution Trabecular Bone Images of the Tibia <i>Janet Blumenfeld, Julio Carballido-Gamio, Roland Krug, Daniel J. Blezek, Illeana Hancu, and Sharmila Majumdar</i>	1924
Static Magnetic Fields Promote Osteoblast-Like Cells Differentiation Via Increasing the Membrane Rigidity <i>Kang-Hsuan Chiu, Keng-Liang Ou, Sheng-Yang Lee, Che-Tong Lin, Wei-Jen Chang, Chang-Chih Chen, and Haw-Ming Huang</i>	1932

The Influence of Expansion Rates on Mandibular Distraction Osteogenesis: A Computational Analysis <i>A. Boccaccio, C. Pappalettere, and D. J. Kelly</i>	1940
Increased Proteolysis of Collagen in an <i>In Vitro</i> Tensile Overload Tendon Model <i>Thomas L. Willett, Rosalind S. Labow, Nicholas C. Avery, and J. Michael Lee</i>	1961
Occupant Dynamics in Rollover Crashes: Influence of Roof Deformation and Seat Belt Performance on Probable Spinal Column Injury <i>Martha W. Bidez, John E. Cochran Jr., Dottie King, and Donald S. Burke III</i>	1973
Finger Kinematic Modeling and Real-Time Hand Motion Estimation <i>P. Cerveri, E. De Momi, N. Lopomo, G. Baud-Bovy, R. M. L. Barros, and G. Ferrigno</i>	1989
A Mathematical Model of Human Respiration at Altitude <i>Matthew Bernard Wolf and Robert P. Garner</i>	2003
An Optimal Cutting-Plane Algorithm for Solving the Non-Unique Probe Selection Problem <i>Michelle A. Ragle, J. Cole Smith, and Panos M. Pardalos</i>	2023

Annals of Biomedical Engineering

The Journal of the Biomedical Engineering Society

Volume 35, Number 12, 2007

Research Articles

A Biodegradable Slotted Tube Stent Based on Poly(L-lactide) and Poly(4-hydroxybutyrate) for Rapid Balloon-Expansion <i>Niels Grabow, Carsten M. Bünger, Christine Schultze, Kathleen Schmohl, David P. Martin, Simon F. Williams, Katrin Sternberg, and Klaus-Peter Schmitz</i>	2031
A Modular Tissue Engineering Construct Containing Smooth Muscle Cells and Endothelial Cells <i>Brendan M. Leung and Michael V. Sefton</i>	2039
Influence of Ventricular Pressure Drop on Mitral Annulus Dynamics Through the Process of Vortex Ring Formation <i>Arash Kheradvar and Morteza Gharib</i>	2050
QRS Template Matching for Recognition of Ventricular Ectopic Beats <i>Vessela Krasteva and Irena Jekova</i>	2065
Stress-Strain Measurements and Viscoelastic Response of Blood Vessels Cryopreserved by Vitrification <i>Jorge L. Jimenez Rios, Paul S. Steif, and Yoed Rabin</i>	2077
Automatic Detection of Microemboli During Percutaneous Coronary Interventions <i>Andreas Voss, Philipp Bahrmann, Rico Schröder, Marcel Wagner, Gerald S. Werner, and Hans R. Figulla</i>	2087
The Effects of Pressure and Shear on Capillary Closure in the Microstructure of Skeletal Muscles <i>Eran Linder-Ganz and Amit Gefen</i>	2095
The Cumulative and Sublethal Effects of Turbulence on Erythrocytes in a Stirred-Tank Model <i>Abdulhameed Aziz, Brian C. Werner, Kevin L. Epting, Christopher D. Agosti, and Wayne R. Curtis</i>	2108
Non-Uniform Plasma Leakage Affects Local Hematocrit and Blood Flow: Implications for Inflammation and Tumor Perfusion <i>Chenghai Sun, Rakesh K. Jain, and Lance L. Munn</i>	2121
Controlled Release in Transdermal Pressure Sensitive Adhesives using Organosilicate Nanocomposites <i>Sohel Shaikh, Anil Birdi, Syed Qutubuddin, Eric Lakatos, and Harihara Baskaran</i>	2130
A Numerical Model of Skin Electropemeabilization Based on <i>In Vivo</i> Experiments <i>Nataša Pavšelj, Veronique Préat, and Damijan Miklavčič</i>	2138
Biphasic Finite Element Model of Solute Transport for Direct Infusion into Nervous Tissue <i>Xiaoming Chen and Malisa Sarntinoranont</i>	2145

The Effect of Soluble Peptide Sequences on Neurite Extension on 2D Collagen Substrates and Within 3D Collagen Gels	2159
<i>Matthew J. Blewitt and Rebecca Kuntz Willits</i>	
Blind Source Separation of Concurrent Disease-Related Patterns from EEG in Creutzfeldt-Jakob Disease for Assisting Early Diagnosis	2168
<i>Chih-I Hung, Po-Shan Wang, Bing-Wen Soong, Shin Teng, Jen-Chuen Hsieh, and Yu-Te Wu</i>	
Modeling of Sound Transmission from Ear Canal to Cochlea	2180
<i>Rong Z. Gan, Brian P. Reeves, and Xuelin Wang</i>	
Quantification of Rigidity in Parkinson's Disease	2196
<i>Behrooz Sepehri, Ali Esteki, Esmaeal Ebrahimi-Takamjani, Golam-Ali Shahidi, Fatemeh Khamseh, and Marzieh Moinodin</i>	
